

TABLE 5.1-1. BENEFICIAL USES OF SURFACE WATERS OF THE LAKE TAHOE HU

Unless otherwise specified, beneficial uses also apply to all tributaries of surface waters identified in Table 5.1-1.

HU No.	HYDROLOGIC UNIT/SUBUNIT DRAINAGE FEATURE	WATERBODY CLASS MODIFIER	BENEFICIAL USES																	RECEIVING WATER					
			MUN	AGR	PRO	LIND	GWR	FRESH	NAV	POW	REC-1	REC-2	COMM	AQUA	WARM	COLD	SAL	WILD	BIOL		RARE	MIGR	SPWN	WQE	FLD
634.00	LAKE TAHOE HYDROLOGIC UNIT																								
634.10	SOUTH TAHOE HYDROLOGIC AREA																								
	TAHOE MEADOWS WETLANDS	WETLANDS	X			X				X	X				X	X							X	X	
	HEAVENLY VALLEY CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X	X	X				
	COLD CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X	X					
	TROUT CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X	X					
	SAXON CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X	X					
	GRASS LAKE WETLANDS	WETLANDS	X	X		X				X	X	X			X	X	X			X	X	X			
	GRASS LAKE	LAKE	X	X		X				X	X	X			X	X	X			X					
	GRASS LAKE CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	MEISS MEADOWS/WETLANDS	WETLANDS	X	X		X				X	X				X	X			X	X	X	X			
	MEISS LAKE	LAKE	X	X		X				X	X	X			X	X			X	X					
	UPPER TRUCKEE RIVER	PERENNIAL STREAM	X	X		X	X			X	X	X			X	X			X	X					
	ECHO LAKES	LAKES	X			X	X			X	X	X			X	X			X						
	UPPER ANGORA LAKE	LAKE	X	X		X	X			X	X	X			X	X			X						
	LOWER ANGORA LAKE	LAKE	X	X		X	X			X	X	X			X	X			X						
	GLEN ALPINE CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	FALLEN LEAF LAKE	LAKE	X				X			X	X	X			X	X			X						
	TAYLOR CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X	X					
	TAYLOR CREEK MEADOW MARSH	WETLANDS	X	X		X				X	X				X	X			X	X	X	X			
	TALLAC CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	CASCADE LAKE	LAKE	X				X			X	X	X			X	X	X		X						
	CASCADE CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	MEEKS CREEK MEADOW/WETLANDS	WETLANDS	X	X		X				X	X				X	X						X	X		
	POPE MARSH/WETLANDS	WETLANDS	X			X				X	X				X	X						X	X		
	OSGOOD SWAMP	WETLANDS	X			X				X	X				X	X	X					X	X		
	EAGLE CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	MINOR SURFACE WATERS		X	X		X				X	X	X			X	X			X						
	MINOR WETLANDS	SPRINGS/SEEPS/EMERGENT/MARSHES	X	X		X	X			X	X	X			X	X	X	X	X	X	X	X	X	X	
634.20	NORTH TAHOE HYDROLOGIC AREA																								
	LONELY GULCH CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	MEEKS CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X	X					
	GENERAL CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X	X					
	McKINNEY CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	MADDERN CREEK	PERENNIAL STREAM	X			X				X	X	X			X	X			X						
634.20	NORTH TAHOE HYDROLOGIC AREA (continued)																								
	BLACKWOOD CREEK	PERENNIAL STREAM	X							X	X	X			X	X			X	X					
	WARD CREEK	PERENNIAL STREAM	X			X				X	X	X			X	X			X	X					
	BURTON CREEK	PERENNIAL STREAM	X			X				X	X	X			X	X			X						
	DOLLAR CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	WATSON CREEK	PERENNIAL STREAM	X			X				X	X	X			X	X			X						
	SNOW CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	CARNELIAN CREEK	PERENNIAL STREAM	X	X		X				X	X	X			X	X			X						
	GRIFF CREEK	PERENNIAL STREAM	X			X				X	X	X			X	X			X						

TABLE 5.1-1. BENEFICIAL USES OF SURFACE WATERS OF THE LAKE TAHOE HU

Unless otherwise specified, beneficial uses also apply to all tributaries of surface waters identified in Table 5.1-1.

HU No.	HYDROLOGIC UNIT/SUBUNIT DRAINAGE FEATURE	WATERBODY CLASS MODIFIER	BENEFICIAL USES																	RECEIVING WATER					
			MUN	AGR	PRO	LIND	GWR	FRESH	NAV	POW	REC-1	REC-2	COMM	AQUA	WARM	COLD	SAL	WILD	BIOL		RARE	MIGR	SPWN	WQE	FLD
	MINOR SURFACE WATERS		X	X																					LAKE TAHOE
	MINOR WETLANDS	SPRINGS/SEEPS/EMERGENT/MARSHES	X	X			X	X			X	X	X			X		X			X	X	X	X	LAKE TAHOE
634.30	TAHOE LAKE BODY HYDROLOGIC AREA																								
	LAKE TAHOE	LAKE	X	X			X		X		X	X	X			X		X	X		X	X			TRUCKEE RIVER
	MINOR SURFACE WATERS		X	X			X	X			X	X	X			X		X	X		X	X			
	MINOR WETLANDS	EMERGENT/MARSHES	X	X			X	X			X	X	X			X		X	X		X	X	X	X	

TABLE 5.1-2. BENEFICIAL USES FOR GROUND WATERS OF THE TAHOE BASIN

BASIN DWR NO.	BASIN NAME	BENEFICIAL USES					
		MUN	AGR	IND	FRSH	AQUA	WILD
6-5.01	TAHOE VALLEY -SOUTH	X	X	X			
6-5.02	TAHOE VALLEY -NORTH	X	X				

**Table 5.1-3
WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES
LAKE TAHOE HYDROLOGIC UNIT**

See Fig. 5.1-1	Surface Waters	Objective (mg/L except as noted) ^{1,2}						
		TDS	Cl	SO ₄	B	N	P	Fe
1	Lake Tahoe	<u>60</u> 65	<u>3.0</u> 4.0	<u>1.0</u> 2.0	<u>0.01</u> -	<u>0.15</u> -	<u>0.008</u> -	--
2	Fallen Leaf Lake	<u>50</u> -	<u>0.30</u> 0.50	<u>1.3</u> 1.4	<u>0.01</u> 0.02	See Table 5.1-4 for additional objectives		
3	Griff Creek	<u>80</u> -	<u>0.40</u> -	--	--	<u>0.19</u> -	<u>0.010</u> -	<u>0.03</u> -
4	Carnelian Bay Creek	<u>80</u> -	<u>0.40</u> -	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
5	Watson Creek	<u>80</u> -	<u>0.35</u> -	--	--	<u>0.22</u> -	<u>0.015</u> -	<u>0.04</u> -
6	Dollar Creek	<u>80</u> -	<u>0.30</u> -	--	--	<u>0.16</u> -	<u>0.030</u> -	<u>0.03</u> -
7	Burton Creek	<u>90</u> -	<u>0.30</u> -	--	--	<u>0.16</u> -	<u>0.015</u> -	<u>0.03</u> -
8	Ward Creek	<u>70</u> 85	<u>0.30</u> 0.50	<u>1.4</u> 2.8	--	<u>0.15</u> -	<u>0.015</u> -	<u>0.03</u> -
9	Blackwood Creek	<u>70</u> 90	<u>0.30</u> -	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
10	Madden Creek	<u>60</u> -	<u>0.10</u> 0.20	--	--	<u>0.18</u> -	<u>0.015</u> -	<u>0.015</u> -
11	McKinney Creek	<u>55</u> -	<u>0.40</u> 0.50	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
12	General Creek	<u>50</u> 90	<u>1.0</u> 1.5	<u>0.4</u> 0.5	--	<u>0.15</u> -	<u>0.015</u> -	<u>0.03</u> -
13	Meeks Creek	<u>45</u> -	<u>0.40</u> -	--	--	<u>0.23</u> -	<u>0.010</u> -	<u>0.07</u> -
14	Lonely Gulch Creek	<u>45</u> -	<u>0.30</u> -	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
	continued...							

Table 5.1-3 (continued)
WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES
LAKE TAHOE HYDROLOGIC UNIT

See Fig. 5.1-1	Surface Waters	Objective (mg/L except as noted) ^{1,2}						
		TDS	Cl	SO ₄	B	N	P	Fe
15	Eagle Creek	<u>35</u> -	<u>0.30</u> -	--	--	<u>0.20</u> -	<u>0.010</u> -	<u>0.03</u> -
16	Cascade Creek	<u>30</u> -	<u>0.40</u> -	--	--	<u>0.21</u> -	<u>0.005</u> -	<u>0.01</u> -
17	Tallac Creek	<u>60</u> -	<u>0.40</u> -	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
18	Taylor Creek	<u>35</u> -	<u>0.40</u> 0.50	--	--	<u>0.17</u> -	<u>0.010</u> -	<u>0.02</u> -
19	Upper Truckee River	<u>55</u> 75	<u>4.0</u> 5.5	<u>1.0</u> 2.0		<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
20	Trout Creek	<u>50</u> 60	<u>0.15</u> 0.20	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -

¹ Annual average value/90th percentile value.

² Objectives are as mg/L and are defined as follows:

- | | |
|-----------------|--|
| B | Boron |
| Cl | Chloride |
| SO ₄ | Sulfate |
| Fe | Iron, Total |
| N | Nitrogen, Total |
| P | Phosphorus, Total |
| TDS | Total Dissolved Solids (Total Filterable Residues) |

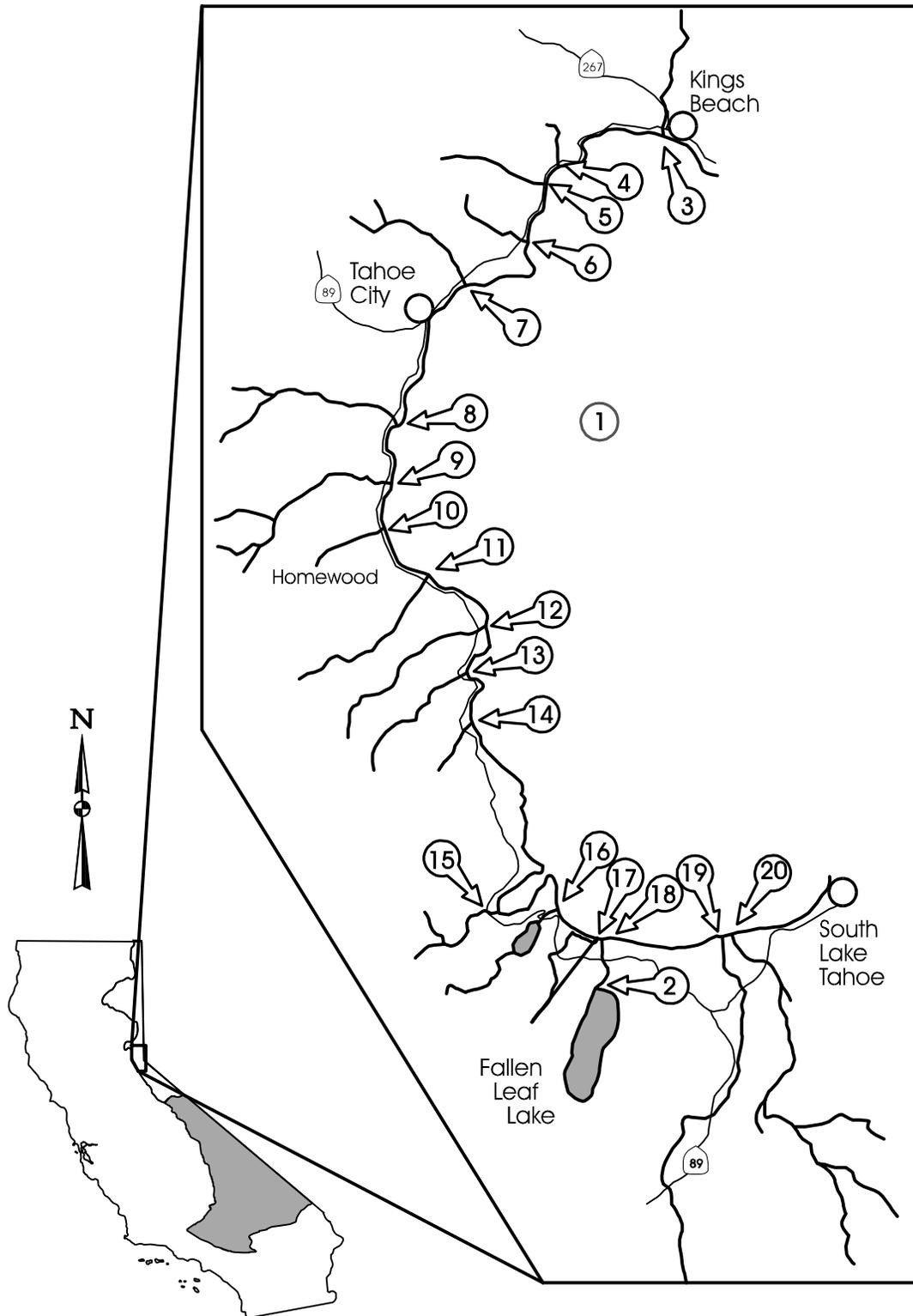
**Table 5.1-4
WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES
FALLEN LEAF LAKE, LAKE TAHOE HYDROLOGIC UNIT**

Constituent	Objective (See Fig. 5.1-1, location 2)
pH ^a	6.5 - 7.9
Temperature ^b	Hypolimnion - ≤15°C Bottom (105m) - ≤7.5°C at no time shall water be increased by more than 2.8°C (5°F).
Dissolved oxygen ^c	% saturation above 80% and DO >7 mg/L except if ration exceeds 80% DO at bottom (105m) > 6mg/L satu
Total nitrogen ^d	0.087 ^e /0.114 ^f /0.210 ^g
Dissolved inorganic - N ^h	0.007 / 0.010 / 0.023
Total phosphorus	0.008 / 0.010 / 0.018
Soluble reactive - P	0.001 / 0.002 / 0.009
Soluble reactive iron	0.004 / 0.005 / 0.012
Total reactive iron	0.005 / 0.007 / 0.030
Chlorophyll-a ^j	0.6 / 0.9 / 1.5
Clarity - Secchi depth ^k - Vertical extinction coefficient	18.5 / 16.0 ^l / 13.6 ^m 0.146 / 0.154 / 0.177 ⁿ
Phytoplankton cell counts ^o	219 / 280 / 450

- ^a 0.5 units above and 0.5 units below 1991 maximum and minimum values. Also reflects stability of this constituent throughout the year.
- ^b Based on 1991 data. Indicates that if temperature in the hypolimnion during the summer exceeds 15°C or if the water at 105m exceeds 7.5°C this would constitute a significant change from existing conditions. Unless there is an anthropogenic source of thermal effluent, which does not currently exist, changes in water temperature in Fallen Leaf Lake are natural. Objectives apply at any time during the defining period.
- ^c Based on coldwater habitat protection and 1991 data base. The need for an objective for the bottom (105m) results from the desire to control primary productivity and deposition of organic matter on the bottom. A decline in bottom DO to below 6 mg/L would indicate a fundamental shift in the trophic state of Fallen Leaf Lake.
- ^d Because of the similarity between the mid-lake and nearshore sites, Fallen Leaf Lake objectives for N, P and Fe are based on the combined mid-lake 8 m and 45 m, and nearshore 8 m concentrations. Units are mg N/L, mg P/L and mg Fe/L.
- ^e Mean annual concentration (May - October) unless otherwise noted.
- ^f 90th percentile value unless otherwise noted.
- ^g Maximum allowable value; 1.5 times the maximum 1991 value. No single measurement should exceed this value unless otherwise noted.
- ^h DIN = NO₃+NO₂+NH₄
- ⁱ Corrected for phaeophytin degradation pigments.
- ^j Units are µg chl-a/L.
- ^k Units are meters.
- ^l 10th percentile since clarity increases with increasing Secchi depth.
- ^m Represents 15% loss of clarity from 10th or 90th percentile value.
- ⁿ Calculated in the photic zone between 1 m below surface to 35 m. Units are per meter.

- Units are cells per milliliter.

Figure 5.1-1
WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES
LAKE TAHOE HYDROLOGIC UNIT



**Table 5.1-5
ONE-HOUR AVERAGE CONCENTRATION FOR AMMONIA^{1,2}**

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

pH	Temperature, °C						
	0	5	10	15	20	25	30
Un-ionized Ammonia (mg/liter NH ₃)							
6.50	0.0091	0.0129	0.0182	0.026	0.036	0.036	0.036
6.75	0.0149	0.021	0.030	0.042	0.059	0.059	0.059
7.00	0.023	0.033	0.046	0.066	0.093	0.093	0.093
7.25	0.034	0.048	0.068	0.095	0.135	0.135	0.135
7.50	0.045	0.064	0.091	0.128	0.181	0.181	0.181
7.75	0.056	0.080	0.113	0.159	0.22	0.22	0.22
8.00	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.25	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.50	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.75	0.065	0.092	0.130	0.184	0.26	0.26	0.26
9.00	0.065	0.092	0.130	0.184	0.26	0.26	0.26
Total Ammonia (mg/liter NH ₃)							
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

1 To convert these values to mg/liter N, multiply by 0.822

2 Source: U. S. Environmental Protection Agency. 1986. Quality criteria for water, 1986. EPA 440/5-86-001.

**Table 5.1-6
FOUR DAY AVERAGE CONCENTRATION FOR AMMONIA^{1,2}**

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

	Temperature, °C						
pH	0	5	10	15	20	25	30
Un-ionized Ammonia (mg/liter NH ₃)							
6.50	0.0008	0.0011	0.0016	0.0022	0.0022	0.0022	0.0022
6.75	0.0014	0.0020	0.0028	0.0039	0.0039	0.0039	0.0039
7.00	0.0025	0.0035	0.0049	0.0070	0.0070	0.0070	0.0070
7.25	0.0044	0.0062	0.0088	0.0124	0.0124	0.0124	0.0124
7.50	0.0078	0.0111	0.0156	0.022	0.022	0.022	0.022
7.75	0.0129	0.0182	0.026	0.036	0.036	0.036	0.036
8.00	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.25	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.50	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.75	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
9.00	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
Total Ammonia (mg/liter NH ₃)							
6.50	3.0	2.8	2.7	2.5	1.76	1.23	0.87
6.75	3.0	2.8	2.7	2.6	1.76	1.23	0.87
7.00	3.0	2.8	2.7	2.6	1.76	1.23	0.87
7.25	3.0	2.8	2.7	2.6	1.77	1.24	0.88
7.50	3.0	2.8	2.7	2.6	1.78	1.25	0.89
7.75	2.8	2.6	2.5	2.4	1.66	1.17	0.84
8.00	1.82	1.70	1.62	1.57	1.10	0.78	0.56
8.25	1.03	0.97	0.93	0.90	0.64	0.46	0.33
8.50	0.58	0.55	0.53	0.53	0.38	0.28	0.21
8.75	0.34	0.32	0.31	0.31	0.23	0.173	0.135
9.00	0.195	0.189	0.189	0.195	0.148	0.116	0.094

1 To convert these values to mg/liter N, multiply by 0.822.

2 Source: U. S. Environmental Protection Agency. 1992. Revised tables for determining average freshwater ammonia concentrations.

Table 5.1-7
EXAMPLE AMMONIA SPREADSHEET OUTPUT
 (USEPA AMMONIA CRITERIA CALCULATOR*)

Required user inputs: 1-h Temp. Cap = 20°; 4-d Temp. Cap = 15°; Temp., °C = 10;
 pH = 7.0

One-hour criteria not to exceed, mg/L as NH₃

Parameter	0<T<TCAP			TCAP<T<30		
	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0
FT	1.995	1.995	1.995	1.000	1.000	1.000
FPH	2.810	2.810	1.000	2.810	2.810	1.000
Unionized NH ₃	0.0464	0.0464	0.1303	0.0925	0.0925	0.2600
Total NH ₃ +NH ₄	25.0369	25.0369	70.3414	49.9552	49.9552	140.3495

Four-day criteria not to exceed, mg/L as NH₃

Parameter	0<T<TCAP			TCAP<T<30		
	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0
FT	1.995	1.995	1.995	1.413	1.413	1.413
FPH	2.810	2.810	1.000	2.810	2.810	1.000
RATIO	28.899	13.500	13.500	28.899	13.500	13.500
Unionized NH ₃	0.0049	0.0106	0.0297	0.0070	0.0149	0.0420
Total NH ₃ +NH ₄	2.6657	5.7064	16.0322	3.7654	8.0605	22.6461

Chemical thermodynamic constants**

pKa = 9.731432321

f = 0.001852518

* A Microsoft Excel spreadsheet
 Use only that temperature and pH column which applies to the input data
 T = Temperature, °C; TCAP = Temperature Cap, °C

** pKa: -log K; K is equilibrium constant for ammonium
 f is the fraction of unionized NH₃/(Total NH₃+NH₄)

**Table 5.1-8
WATER QUALITY CRITERIA FOR
AMBIENT DISSOLVED OXYGEN CONCENTRATION^{1,2}**

	Beneficial Use Class	
	COLD & SPWN ³	COLD
30 Day Mean	NA ⁴	6.5
7 Day Mean	9.5 (6.5)	NA
7 Day Mean Minimum	NA	5.0
1 Day Minimum ^{5,6}	8.0 (5.0)	4.0

¹ From: USEPA. 1986. Ambient water quality criteria for dissolved oxygen. Values are in mg/L.

² These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentrations shown in parentheses. For species that have early life stages exposed directly to the water column (SPWN), the figures in parentheses apply.

³ Includes all embryonic and larval stages and all juvenile forms to 30-days following hatching (SPWN).

⁴ NA (Not Applicable).

⁵ For highly manipulatable discharges, further restrictions apply.

⁶ All minima should be considered as instantaneous concentrations to be achieved at all times.